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trum of a black body as determined by Lummer and Pringsheim and by Kurlbaum. It is thus found that an atom of hydrogen weighs  $1.64 \times 10^{-24}$  grams. Professor Planck compares this result, together with other results depending upon it, with previous approximate determinations of this quantity, and he remarks that the values determined by his formula are *not approximations*, but that the calculations are absolutely valid, provided that his theory is true.

W. S. F.

#### NOTES ON INORGANIC CHEMISTRY.

IN an article by Berthelot in the *Annales de Chimie et de Physique* on Egyptian gold, it appears that in the earliest epochs, argentiferous alluvial gold was used for coins and other articles. Only later, from the time of Croesus down, was the gold refined. The period of manufacture can be approximately told by analysis, owing to the rarity of minerals which yield gold free from silver. Specimens of gold from the fifth and twelfth dynasties show about four per cent. of silver, but those from the Persian epoch consist of almost pure gold.

IN a recent number of the *Chemical News*, Dr. J. H. Gladstone gives an account of analyses made of specimens of gold leaf from Egyptian mummies, supplementing the work of Berthelot spoken of above. Down to the time of the eighteenth dynasty the foil is evidently made from the native alloy, containing from four to eighteen per cent. of silver, the latter alloy closely approaching electrum. The specimens from the first dynasty show a similarity of composition, coming from a single source, but those from the later dynasties differ among themselves, and evidently had different origins. Little copper is found in any of the foils. A very thin superficial crust of chlorid of silver is found in some of the foil, indicating a slow diffusion of one part of the alloy—the silver—till it reaches the outside surface, where it meets with the chloride that exists in the sands of the desert. That the Egyptians were acquainted with different qualities of gold is evidenced by the Harris papyrus, containing the annals of Rameses III., about B. C. 1200, where mention is made of gold, pure gold, good gold, white gold, best gold,

gold of the second quality, fine gold of the land, gold of the land of Koebti, and of Kush.

THE recent cases of poisoning in England from arsenic contained in beer, and the differing results obtained by the chemists who have analyzed the beer in question, have given rise to an extended discussion in the *Chemical News* and elsewhere, as to the value of the tests for arsenic which are commonly relied upon to detect and estimate the amount of arsenic in suspected substances. This discussion is well timed, for, in the whole field of toxicology, no substance is more frequently to be tested for than arsenic. The test most generally depended on is Marsh's, and this is taught in almost every laboratory, of college and medical school. As a matter of fact, while this test is thoroughly reliable in the hands of a skilled analyst, it is beset with so many difficulties, which interfere with its accuracy, that it is of little value except when carried out by a chemist who has had long experience with it; indeed in the hands of a neophyte it is often wholly misleading. This is well shown in the recent cases, where the results obtained by the different analysts were very conflicting. On the other hand, even with unskilled chemists, Reinsch's test, when properly carried out, is thoroughly to be depended on, and is under ordinary circumstances more delicate than that of Marsh. Not the least of its advantages is the fact that it requires but a short time and the simplest apparatus only. Its value is well brought out by no less an authority than A. H. Allen, writing in the *Chemical News*. It is greatly to be hoped that the present agitation will result in placing the tests for arsenic on their proper relative basis.

SOMETIME since attention was called in this column to the fact that in the examination of quite a number of canned goods, tin was found present in every instance. A paper on the same subject by F. Wirthle has appeared in the *Chemiker Zeitung*, dealing with canned meat, mostly beef. The goods were from one to five years old, and in each case tin was found, and, as was also true of the experiments above referred to by Cowan and the writer, only the

slightest trace of lead. The quantity of tin found increased from year to year, as would have been inferred from the greater corrosion in the interior of the can in the older specimens. Wirthle concludes that the tin was in the form of the basic chlorid, and due to the action of the common salt in the meat, though in one instance the sulfid of tin was found. On the other hand tin was found by Cowan in canned fruits and tomatoes, and by Weber in canned pumpkins. It is greatly to be wished that a series of experiments should be carried out with a view of determining the effect of tin in small quantities upon the human organism, for little is known of its physiological action. From the amounts which are constantly ingested with canned goods, and seemingly without injury, it is to be inferred that it has little if any deleterious action, but it would be well were this established.

IN this connection, Roman and Delluc call attention in the *Journal de Pharmacie et de Chimie* to the presence of zinc in some samples of 95 per cent. alcohol examined by them. Since similar alcohol showed a reaction for zinc after being kept in contact with galvanized iron scrap for two days, the presence of the zinc in alcohol was accounted for by its having been kept, as is often the custom, in a galvanized iron vessel.

J. L. H.

#### THE U. S. NAVAL OBSERVATORY.

THE Naval Appropriation Bill, as passed by the Senate, contains the following provisions, authorizing the appointment of a board of visitors to the Naval Observatory and incidentally requiring the superintendent to be a line officer of the Navy :

For the expenses of the board of visitors to the Naval Observatory, two thousand dollars. There shall be appointed by the President from persons not officers of the United States a board of six visitors to the Naval Observatory, four to be astronomers of high professional standing and two to be eminent citizens of the United States. Appointments to this board shall be made for periods of three years, but provision shall be made by initial appointments for shorter terms so that two members shall retire in each year.

Members of this board shall serve without compensation, but the Secretary of the Navy shall pay the actual expenses necessarily incurred by members of the board in the discharge of such duties as are assigned to them by the Secretary of the Navy or are otherwise imposed upon them. The board of visitors shall make an annual visitation to the Observatory at a date to be determined by the Secretary of the Navy, and may make such other visitations not exceeding two in number annually by the full board or by a duly appointed committee as may be deemed needful or expedient by a majority of the board. The board of visitors shall report to the Secretary of the Navy at least once in each year the result of its examinations of the Naval Observatory as respects the condition of buildings, instruments, and apparatus, and the efficiency with which its scientific work is prosecuted. The board of visitors shall prepare and submit to the Secretary of the Navy regulations prescribing the scope of the astronomical and other researches of the Observatory and the duties of its staff with reference thereto. When an appointment or detail is to be made to the office of astronomical director, director of the Nautical Almanac, astronomer, or assistant astronomer, the board of visitors may recommend to the Secretary of the Navy a suitable person to fill such office, but such recommendation shall be determined only by a majority vote of the members present at a regularly called meeting of the board held in the city of Washington. The Superintendent of the Naval Observatory shall be a line officer of the Navy of a rank not below that of captain.

This is what Senator Chandler promised as legislation to improve the management of the Observatory, but it is not likely to meet with the approval of those interested in the efficiency of the institution. A board of visitors of this character has but little real power, whereas it would serve as an excuse for any shortcomings there may be in the work of the Observatory. The board may recommend persons to fill vacancies in the staff, but it is not clear that the Secretary of the Navy is under any obligations to follow its recommendations. The astronomers apparently remain naval officers and the superintendent must be a line officer. These provisions make it still more desirable to urge the passage of Senator Morgan's bill, presented in the last issue of this JOURNAL.